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What is claimed is:

1. A method for fabricating a titanium nitride (TiN) sensing membrane on an extended gate field effect transistor (EGFET), comprising the steps of:

depositing a layer of aluminum on a gate terminal of the EGFET using thermal evaporation, wherein the layer of aluminum extends from the gate terminal to a sensitive window of the EGFET; and

forming the TiN sensing membrane on an exposed part of the layer of aluminum in the sensitive window as an ion sensitive sensor (pH sensor) using a radio frequency (RF) sputtering process during which TiN is used as a sputtering target and a mixture of argon and nitrogen in the ratio of 9:1 is used as a reactant.

2. The method as claimed in claim 1, wherein a substrate temperature of 150°C, a deposition pressure of 5 milli-torrs, a sputtering duration time of 1 hour, and an RF power of 90 watts are the preferred operating conditions for forming the TiN sensing membrane.

3. The method as claimed in claim 1, wherein the TiN sensing membrane has a thickness of about 1800 to 2900Å.

4. The method as claimed in claim 1, wherein a gate terminal of the pH sensor is referred to as a reference electrode of the pH sensor.

5. The method as claimed in claim 1, wherein the EGFET includes a temperature sensor and a photosensor.

6. The method as claimed in claim 5 further comprising the steps of:

forming an N-type well over a P-type substrate and then a P-type diffusion region within the N-type well using an ion implantation process to form a temperature diode consisting of the P-type diffusion region with respect to the N-type well, such that the temperature diode acts as a temperature sensor to sense a temperature under a forward bias; and

forming an N-type diffusion region within the P-type substrate using an ion implantation process to form a photodiode consisting of the N-type diffusion region with respect to the P-type substrate, such that the photodiode acts as a photosensor to sense a photointensity under a reversed bias.

7. The method as claimed in claim 6, wherein the temperature sensor senses the temperature by determining a decreased turn-on voltage to be a higher temperature under forward bias.

8. The method as claimed in claim 6, wherein the photosensor senses the photo intensity using a feature that a current caused by changing charge varies with the degree of the photointensity under the reversed bias.